FACT SHEET

The United States Environmental Protection Agency (EPA)
Plans To Reissue A
National Pollutant Discharge Elimination System (NPDES) Permit To:

The City of Blackfoot
157 N. Broadway
Blackfoot, Idaho 83221

Permit Number: ID-002004-4
Public Notice start date: July 19, 2000
Public Notice expiration date: August 18, 2000

EPA Proposes NPDES Permit Reissuance.

EPA proposes to reissue an NPDES permit to the City of Blackfoot. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant to the Snake River. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged.

This Fact Sheet includes:

- information on public comment and public hearing procedures
- a description of the current discharge and current sewage sludge (biosolids) practices
- a listing of proposed effluent limitations, schedules of compliance, and other conditions
- a map and description of the discharge location
- detailed technical material supporting the conditions in the permit

The State of Idaho Proposes Certification.

EPA is requesting that the Idaho Division of Environmental Quality certify the NPDES permit for the City of Blackfoot, under section 401 of the Clean Water Act. The state provided preliminary comments on the draft permit, and these comments have been incorporated into the draft permit.

Public Comment.

Persons wishing to comment on or request a Public Hearing for the draft permit may do so in writing by the expiration date of the Public Notice. A request for a Public Hearing must state the nature of the issues to be raised as well as the requester's name, address and telephone number. All comments and requests for Public Hearings must be in writing and should be submitted to EPA as described in the Public Comments Section of the attached Public Notice.

After the Public Notice expires, and all comments have been considered, EPA's Director of the Office of Water will make a final decision regarding permit reissuance.

Persons wishing to comment on State Certification should submit written comments by the Public Notice expiration date to the Idaho Division of Environmental Quality (IDEQ) at 224 S. Arthur, Pocatello, Idaho 83204. A copy of the comments should also be submitted to EPA.

If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If comments are received, EPA will address the comments and issue the permit. The permit will become effective 30 days after the issuance date, unless a permit appeal is filed within 30 days.

Documents are Available for Review.

The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday (See address below). The fact sheet and draft permit may also be viewed electronically at **www.epa.gov/r10earth/water.htm**.

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, OW-130
Seattle, Washington 98101
(206) 553-1774 or
1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The Fact Sheet and draft permit are also available at:

EPA Idaho Operations Office
1435 North Orchard Street
Boise, Idaho 83706
(208) 378-5746

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I. APPLICANT

City of Blackfoot
NPDES Permit No.: ID-002004-4

Facility Mailing Address:
2505 Riverton Road
Blackfoot, Idaho 83221

II. FACILITY INFORMATION

A. Treatment Plant Description

The City of Blackfoot owns, operates, and has maintenance responsibility for a facility which treats domestic sewage from local residents and commercial establishments. The facility's application indicates that the design flow of the facility is 3.0 million gallons per day (mgd). From 1996 through 1999 the facility's average monthly discharge has been between 1.1 mgd and 2.1 mgd. Treatment of wastewater consists of metering, grit removal, influent screening, biological treatment through conventional activated sludge, clarification, and chlorination. Sludge is dried and land disposed.

The plant receives primarily domestic wastewater from residential and commercial sources. Industrial sources include three fresh-pack potato processors, one cheese/dairy plant, and an industrial laundry. The city has an approved pretreatment program which controls industrial inputs prior to discharge to the collection system.

The City is in the process of updating the facility. Work to be completed include increasing capacity to 5.1 MGD, converting to ultraviolet (UV) disinfection from chlorination, modifying the headworks, changing the aeration system, converting the sludge to Class A from Class B, and installing standby power for the entire plant. Because the plant and capacity upgrades will occur within the next two years, limits are included based on current design capacity as well as the new design capacity. The limits based on new design capacity will not go into effect until the upgrade is complete.

B. Background Information

The NPDES permit for the wastewater treatment plant expired on November 1, 1993. Under federal law, specifically, the Administrative Procedures Act (APA), a federally issued NPDES permit is administratively extended (i.e., continues in force and effect) provided that the permittee submits a timely and complete application for a new permit prior to the expiration of the current permit. Since the City did submit a timely application for a new permit, the current permit was administratively extended.

A review of the facility's Discharge Monitoring Reports[1] for the past five years indicates that the facility has generally been in compliance with its permit effluent limits.

A map has been included in Appendix A which shows the location of the treatment plant and the discharge location.

III. RECEIVING WATER

A. Outfall location/ Receiving Water

The treated effluent from the City of Blackfoot wastewater treatment facility is discharged from outfall 001, located at latitude 43E 10' 56" and longitude 112E 23' 14", to the Snake River at approximately river mile 776.8.

Flow information was based on information from the USGS gauging station near Shelley, Idaho (13060000). Therefore, this flow will be used to determine if water quality-based effluent limitations are required for this discharge.

B. Water Quality Standards

A State's water quality standards are composed of use classifications, numeric and/or narrative water quality criteria, and an anti-degradation policy. The use classification system designates the beneficial uses (such as cold water biota, contact recreation, etc.) that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary, by the State, to support the beneficial use classification of

[1]Discharge monitoring reports are forms that the facility uses to report the results of monitoring the facility has done in compliance with their NPDES permit.

each water body. The anti-degradation policy represents a three tiered approach to maintain and protect various levels of water quality and uses.

The Idaho *Water Quality Standards and Wastewater Treatment Requirements* (IDAPA 16.01.02.150.08.) protect the Snake River (US-22, Snake River, river mile 791 to American Falls Reservoir) for the following beneficial use classifications: domestic water supply, cold water biota, salmonid spawning, and primary contact recreation.

The criteria that the State of Idaho has deemed necessary to protect the beneficial uses for the Snake River, and the State's anti-degradation policy are summarized in Appendix B.

C. Water Quality Limited Segment

A water quality limited segment is any waterbody, or definable portion of water body, where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards. The Snake River has been listed as a water quality limited segment. This section of the river has been listed as water quality limited for nutrients, sediment, dissolved oxygen, flow alteration and pathogens.

Section 303(d) of the Clean Water Act (CWA) requires States to develop a Total Maximum Daily Load (TMDL) management plan for water bodies determined to be water quality limited. A TMDL documents the amount of a pollutant a waterbody can assimilate without violating a state's water quality standards and allocates that load to known point sources and nonpoint sources. The Idaho Division of Environmental Quality (IDEQ) is scheduled to complete a TMDL for the Snake River by the year 2003.

IV. EFFLUENT LIMITATIONS

In general, the Clean Water Act requires that the effluent limits for a particular pollutant be the more stringent of either technology-based effluent limits or water quality-based limits. A technology based effluent limit requires a minimum level of treatment for municipal point sources based on currently available treatment technologies. A water quality based effluent limit is designed to ensure that the water quality standards of a waterbody are being met. For more information on deriving technology-based effluent limits and water quality-based effluent limits see Appendix

C. The following summarizes the proposed effluent limitations that are in the draft permit.

A. The pH range shall be between 6.0 - 9.0 standard units.

B. Removal Requirements for BOD_5 and TSS: For any month, the monthly average effluent concentration shall not exceed 15 percent of the monthly average influent concentration.

C. There shall be no discharge of floating solids or visible foam other than trace amounts.

D. Table 1, below, presents the proposed effluent limits for BOD_5, TSS, fecal coliform bacteria, chlorine, and ammonia.

TABLE 1: Monthly, Weekly and Daily Effluent Limitations

Parameters	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit
BOD_5 **Limits based on expanded capacity**	30 mg/L (750.3 lbs/day) **30 mg/L** **(1276 lbs/day)**	45 mg/L (1126 lbs/day) **45 mg/L** **(1914 lbs/day)**	---
TSS **Limits based on expanded capacity**	30 mg/L (750.3 lbs/day) **30 mg/L** **(1276 lbs/day)**	45 mg/L (1126 lbs/day) **45 mg/L** **(1914 lbs/day)**	---
Fecal Coliform Bacteria	---	200 colonies/100 ml	---
E. coli Bacteria	126 colonies/100 ml	---	406 colonies/100 ml
Total Residual Chlorine **Limits based on expanded capacity**	119.1 µg/L (3.0 lbs/day) **75.4 Fg/L** **(3.2 lbs/day)**	---	172.6 µg/L (4.3 lbs/day) **109.3 Fg/L** **(4.6 lbs/day)**

Total Ammonia **Limits based on expanded capacity**	3.83 mg/L (95.8 lbs/day) **2.32 mg/L** **(98.7 lbs/day)**	---	10.7 mg/L (267.7 mg/L) **6.48 mg/L** **(275.6 lbs/day)**

V. MUNICIPAL SEWAGE SLUDGE/BIOSOLIDS MANAGEMENT

The biosolids conditions in the administratively extended permit were based on best professional judgment since EPA had not promulgated biosolids regulations at the time of permit issuance. Since that time EPA has promulgated regulations for the use and disposal of biosolids. Therefore, the biosolids requirements contained in the administratively extended permit have not been incorporated into the proposed permit.

EPA Region 10 has recently decided to separate the permitting of wastewater discharges and the disposal of biosolids. Under the Clean Water Act, EPA has the authority to issue separate "sludge only" NPDES permits for the purposes of regulating biosolids. EPA has historically implemented the biosolids standards by inclusion of the requirements in facility's NPDES wastewater permit, the other option authorized by the Act.

EPA will issue a sludge-only permit to this facility at a later date. This will likely be in the form of a general permit through which EPA can cover multiple facilities.

Meanwhile, the environment will be protected since 1) the permittee's sludge activities will continue to be subject to the national sewage sludge standards at 40 CFR Part 503 and 2) IDEQ conducts a program to review and approve biosolids activities. Part 503 contains provisions relating to pollutants in sewage sludge, the reduction of pathogens in sewage sludge, the reduction of the characteristics in sewage sludge that attract vectors, the quality of the exit gas from a sewage sludge incinerator stack, the quality of sewage sludge that is placed in a municipal solid waste landfill unit, the sites where sewage sludge is either land applied or placed for final disposal, and sewage sludge incinerators. The Act prohibits any use or disposal of biosolids not in compliance with these standards. EPA has the authority under the Act to enforce these standards directly, including in the absence of a permit. The Act does not require the facility to have a permit prior to the use or disposal of its biosolids.

VI. MONITORING REQUIREMENTS

Section 308 of the Clean Water Act and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather data for future effluent limitations or to monitor effluent impacts on receiving water quality. The Permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports to EPA.

Table 2 presents the proposed effluent monitoring requirements.

TABLE 2: City of Blackfoot Waste Water Treatment Plant Monitoring Requirements

Parameter	Location	Sampling Frequency
Total Flow	Influent or Effluent	Continuous
BOD_5	Influent and Effluent	2 days/week 2 days/week
TSS	Influent and Effluent	2 days/week 2 days/week
Fecal Coliform Bacteria	Effluent	5 days/week
E. coli bacteria	Effluent	2 days/week

Parameter	Location	Sampling Frequency
pH	Effluent	5 days/week
Dissolved Oxygen	Effluent	2 days/week
Temperature, EC	Effluent	1/month
Total Residual Chlorine	Effluent	1/day
Total Ammonia as N, mg/L	Effluent	1/week
Nitrate-Nitrite, mg/L	Effluent	1/week
Total Kjeldahl Nitrogen, mg/L	Effluent	1/week
Total Phosphorus	Effluent	1/week
Lead	Effluent	1/month
Hardness, as mg/L $CaCO_3$	Effluent	1/month
Alkalinity, as mg/L $CaCO_3$	Effluent	1/month
Whole effluent toxicity	Effluent	Once every 6 months w/2 species

Monitoring for nitrate-nitrite, total kjeldahl nitrogen, and total phosphorus have been included in the draft permit to support the development of the TMDL for the Snake River.

TABLE 3: City of Blackfoot Ambient Monitoring Requirements

Parameter	Effluent Sampling Frequency	Upstream Sampling Frequency[1]
Flow, mgd	Continuous	Daily[2]
BOD_5, mg/L	2 days/week	1/month

Parameter	Effluent Sampling Frequency	Upstream Sampling Frequency[1]
TSS, mg/L	2 days/week	1/month
Dissolved Oxygen, mg/L	1/week	1/month
Total Phosphorus, mg/L	1/week	1/month
Ortho-phosphorus, mg/L	1/week	1/month
Total Ammonia as N, mg/L	1/week	1/month
Total Kjeldahl Nitrogen, mg/l	1/week	1/month
Nitrate-Nitrite, mg/L	1/week	1/month
Hardness as $CaCO_3$, mg/L	1/quarter	1/quarter
Alkalinity as $CaCO_3$, mg/L	1/quarter	1/quarter
Temperature[3], EC	1/month	1/month
pH, standard units	5 days/week	1/month
Turbidity, NTU	1/month	1/month
Copper [4,5], µg/L	---	1/quarter
Lead[4,5], µg/L	1/quarter	1/quarter
Zinc[4,5], µg/L	---	1/quarter
E. coli bacteria, [6] #100/ml	1/month	1/month

1 If sampling during the specified period is prevented by a severe weather event such as ice on the river or flooding, the sample shall be collected at the next earliest opportunity.
2 The daily flow from the nearest USGS gauging station on the day of sampling upstream.
3 Temperature samples shall be collected at the time of day when the water temperature is highest.
4 Metals shall be analyzed as dissolved.
5 Ambient metals monitoring shall continue until 12 samples, on separate days, have been collected. Hardness and alkalinity shall be monitored whenever metals samples are collected.
6 This parameter shall be collected as a grab sample.

VII. OTHER PERMIT CONDITIONS

A. Quality Assurance Plan

The federal regulation at 40 CFR 122.41(e) requires the Permittee to develop a Quality Assurance Plan to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The Permittee is required to complete a Quality Assurance Plan within 60 days of the effective date of the final permit. The Quality Assurance Plan shall consist of standard operating procedures the Permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting.

B. Design Criteria

The permit also requires that the permittee compute an annual average value for flow, and BOD_5 and TSS loading entering the facility based on the previous 12 months of data or all data available. When the average annual values exceed the 85 percent of the design criteria for the WWTF three months in a row, the permittee is required to develop a facility plan and schedule within 18 months from the date of the exceedance. This plan or strategy is required to ensure that the permittee will continue to comply with permit limits if capacity is being exceeded.

C. Whole Effluent Toxicity Testing

Whole effluent toxicity tests are laboratory tests that use small vertebrate and invertebrate species, or plants, to measure the toxicity of an effluent. The effluent concentration that results in the death of 50% of test organisms during a 96-hour exposure determines the short-term (acute) toxicity. The highest effluent concentration that causes reduced growth or reduced reproduction of test organisms or plants during a 1-week (or other specified period of) exposure determines the long-term (chronic) toxicity.

Federal regulations at 40 CFR § 122.44(d)(1) require that permits contain limits on whole effluent toxicity when a discharge has reasonable potential to cause or contribute to an exceedance of a narrative or numeric water quality standard. Idaho water quality standards at IDAPA 16.01.02.200.02 state that surface waters of the state shall be free from toxic substances in concentrations that impair designated beneficial uses. Based on the minimum dilution of 30.5 (at current

design capacity) and 18:1 (at the expanded plant capacity), the discharged WET should be less than or equal to 18 TUc. The available data, consisting of four WET tests, indicate no toxicity. This data set is too limited to determine reasonable potential, so the facility will be required to conduct ten more suites of tests using the *Ceriodaphnia dubia* (water flea) and the *Pimephales promelas* (fathead minnow). This continued monitoring is justified in that there are industrial users discharging to the City's sewer system. In addition, this additional information will be needed to properly characterize the new expansion of the wastewater treatment plant.

D. Additional Permit Provisions

Sections II, III, and IV of the draft permit contain standard regulatory language that must be included in all NPDES permits. Because they are regulations, they cannot be challenged in the context of an NPDES permit action. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and other general requirements.

VIII. OTHER LEGAL REQUIREMENTS

A. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service if their actions could adversely affect any threatened or endangered species. EPA has determined that issuance of this permit will not affect any of the endangered species in the vicinity of the discharge. See Appendix D for further details.

B. State Certification

Section 401 of the Clean Water Act requires EPA to seek state certification before issuing a final permit. As a result of the certification, the state may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with water quality standards. In a letter dated June 19, 2000, the Idaho Division of Environmental Quality indicated that the effluent limits and ambient monitoring requirements included in the draft permit will be protective of the State's water quality standards while allowing the state to

collect sufficient information to establish TMDLs for the current listed pollutants in this reach of the Snake River.

C. Permit Expiration

This permit will expire five years from the effective date of the permit.

APPENDIX A

Wastewater Treatment Plant Location

APPENDIX B
WATER QUALITY STANDARDS

I. Water Quality Criteria

For the City of Blackfoot discharge, the following water quality criteria are necessary for the protection of the beneficial uses of the Snake River (US-22, Snake River, river mile 791 to American Falls Reservoir):

A. IDAPA 16.01.02.200.02 - Surface waters of the State shall be free from toxic substances in concentrations that impair designated beneficial uses.

B. IDAPA 16.01.02.200.05 - Surface waters of the State shall be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses.

C. IDAPA 16.01.02.200.06 - Excess Nutrient. Surface waters of the State shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses.

D. IDAPA 16.01.02.200.08 - Sediment. Sediment shall not exceed quantities specified in sections 250 and 252, or , in the absence of specific sediment criteria, quantities which impair designated beneficial uses. Determinations of impairment shall be based on water quality monitoring and surveillance and the information utilized as described in section 350.

E. IDAPA 16.01.02.251.01. - Primary Contact Recreation: Waters designated for primary contact recreation are not to contain *E. coli* bacteria significant to the public health in concentrations exceeding:

1. a single sample of 406/100 ml, or
2. a geometric mean of 126/100 ml based on a minimum of five samples taken every three (3) to five (5) days over a thirty day period.

F. IDAPA 16.01.02.420.05.a. - Disinfection requirements for Sewage Wastewater Treatment Plant Effluent: when disinfection is determined to be required under subsection 420.04, sewage wastewater treatment plant effluent must receive adequate disinfection by any disinfection process which satisfies the following criteria, prior to discharge to any receiving water.

1. Fecal coliform concentrations in secondary treated effluent must not exceed a geometric mean of 200/100 ml based on no more than one week's data and a minimum of five samples;

2. The samples must be representative of all samples collected during the week; and

3. Geometric mean computations must be calculated and recorded weekly.

G. IDAPA 16.01.02.250.01.a. - Hydrogen ion concentration (pH) values within the range of 6.5 to 9.5 standard units.

H. IDAPA 16.01.02.250.01.c.i-ii. - The one (1) hour average concentration of total residual chlorine shall not exceed nineteen (19) µg/L. The four (4) day average concentration shall not exceed eleven (11) µg/L.

I. IDAPA 16.01.02.250.02.a. - Dissolved oxygen concentrations shall exceed 6 mg/L at all times.

J. IDAPA 16.01.02.250.02.c.i - The one hour average concentration of un-ionized ammonia (as N) is not to exceed (0.43/A/B/2) mg/L, where:

A = 1 if the water temperature (T) is $ 20EC, or
$A = 10^{(0.03(20-T))}$ if T < 20EC, and

B = 1 if the pH is $ 8.0, or
$B = (1+ 10^{(7.4-pH)}) \div 1.25$ if pH is < 8.0

Using the 95^{th} percentile upstream pH and temperature (8.7 standard units and 20.0 EC, respectively) the unionized ammonia criterion is 0.22 mg/L and the total ammonia criterion is 1.97 mg/L.

K. IDAPA 16.01.02.250.02.c.ii - The four day average concentration of un-ionized ammonia (as N) is not to exceed (0.66/A/B/C) mg/L, where:

A = 1.4 if T is $ 15EC, or
$A = 10^{(0.03(20-T))}$ if T < 15EC, and

B = 1 if the pH is $ 8.0, or
B = $(1+ 10^{(7.4-pH)}) \div 1.25$ if pH is < 8.0

C = 13.5 if pH is $ 7.7, or
C = $20(10^{(7.7-pH)}) \div (1+ 10^{(7.4-pH)})$ if the pH is < 7.7

Using the 95th percentile upstream pH and temperature (8.7 standard units and 20.0 EC, respectively) the unionized ammonia criterion is 0.0349 mg/L and the total ammonia criterion is 0.22 mg/L.

L. Metals criteria.

Parameter	Equation	Acute Criterion[1]	Equation	Chronic Criterion[2]
Cadmium	$0.976Xe^{(1.128X(\ln(H))-3.828)}$	4.96	$0.947Xe^{(0.7852X(\ln(H))-3.49)}$	1.20
Chromium	$0.316Xe^{(0.819X\ln(H))+3.688)}$	684.6	$0.86Xe^{(0.819X(\ln(H))+1.561)}$	210.9
Copper	$0.96Xe^{(0.9422X(\ln(H))-1.464)}$	21.95	$0.96Xe^{(0.8545X(\ln(H))-1.465)}$	13.55
Lead	$0.904Xe^{(1.273X(\ln(H))-1.46)}$	86.54	$0.924Xe^{(1.273X(\ln(H))-4.705)}$	3.15
Nickel	$0.998Xe^{(0.846X(\ln(H))+3.3612)}$	1780	$0.997Xe^{(0.846X(\ln(H))+1.1645)}$	187.3
Silver	$0.85Xe^{(1.72X(\ln(H))-6.52)}$	5.49		NA
Zinc	$0.978Xe^{(0.8473X(\ln(H))+0.8604)}$	143.9	$0.986Xe^{(0.8473X(\ln(H))+0.7614)}$	124.5
Cadmium conversion factor	1.136672-[ln(H)X0.041838]	0.93	1.101672-(ln(H)X0.041838)	0.90
Lead conversion factor	1.46203-(ln(H)X.145712)	0.75	1.46203-(ln(H)X0.145712)	0.76

1 Acute hardness used (5th percentile of mixed hardness): 131
2 Chronic hardness used (5th percentile of mixed hardness): 123

II. Anti-Degradation Policy

The State of Idaho has adopted an anti-degradation policy as part of their water quality standards. The anti-degradation policy represents a three tiered approach to maintain and protect various levels of water quality and uses. The three tiers of protection are as follows:

A. Tier 1 - Protects existing uses and provides the absolute floor of water quality.

B. Tier 2 - Protects the level of water quality necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water in waters that are currently of higher quality than required to support these uses. Before water quality in Tier 2 waters can be lowered , there must be an anti-degradation review consisting of: (1) a finding that it is necessary to accommodate important economic or social development in the area where the waters are located (2) full satisfaction of all intergovernmental coordination and public participation provisions; and (3) assurance that the highest statutory and regulatory requirements for point sources and best management practices for nonpoint sources are achieved. Furthermore, water quality may not be lowered to less than the level necessary to fully protect the "fishable/swimmable" uses and other existing uses.

C. Tier 3 - Protects the quality of outstanding national resources, such as waters of national and State parks and wildlife refuges and waters of exceptional recreational or ecological significance. There may be no new or increased discharges to these waters and no new or increased discharges to tributaries of these waters that would result in lower water quality.

The Snake River is a tier 1 waterbody. Therefore, water quality should be such that it results in no mortality and no significant growth or reproductive impairment of resident species. An NPDES permit cannot be issued that would result in the water quality criteria being violated. The draft permit contains effluent limits which ensures that the existing beneficial uses for the Snake River will be maintained.

APPENDIX C
BASIS FOR EFFLUENT LIMITATIONS

The CWA requires Publicly Owned Treatment Works to meet performance-based requirements (also known as technology based effluent limits) based on available wastewater treatment technology. EPA may find, by analyzing the effect of an effluent discharge on the receiving water, that technology based effluent limits are not sufficiently stringent to meet water quality standards. In such cases, EPA is required to develop more stringent, water quality-based effluent limits designed to ensure that water quality standards are met. The draft effluent limits reflect whichever limits (technology-based or water quality-based) are more stringent. The following explains in more detail the derivation of technology based effluent limits and water quality based effluent limits.

I. Technology-based Effluent Limitations

The CWA requires Publicly Owned Treatment Works to meet performance-based requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as "secondary treatment," that all POTWs were required to meet by July 1, 1977. EPA developed "secondary treatment" regulations which are specified in the 40 CFR 133. These technology-based effluent limits apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH. The technology based effluent limits applicable to the City of Blackfoot are as follows:

A. 5 day Biochemical Oxygen Demand (BOD_5) and Total Suspended Solids (TSS):

Average Monthly Limit =	30 mg/L
Average Weekly Limit =	45 mg/L
Percent Removal Requirements =	85 %

B. Federal regulations at (40 CFR § 122.45 (f)) require BOD_5 and TSS limitations to be expressed as mass based limits using the design flow of the facility. The loading is calculated as follows: concentration X design flow X 8.34.

BOD and TSS loading, monthly average =	
30 mg/L X 3.0 mgd X 8.34 =	750.6 lbs/day
BOD and TSS loading, weekly average =	
45 mg/L X 3.0 mgd X 8.34 =	1126 lbs/day

When plan capacity is increased to 5.1 MGD, the loading will be as follows.

BOD and TSS loading, monthly average =
30 mg/L X 5.1 mgd X 8.34 = 1276 lbs/day
BOD and TSS loading, weekly average =
45 mg/L X 5.1 mgd X 8.34 = 1914 lbs/day

C. The pH range shall between 6.0 - 9.0 standard units.

D. Fecal Coliform Bacteria: In addition to the above, the Idaho *Water Quality Standards and Wastewater Treatment Requirements* (IDAPA16.01.02.420.02.b) require that fecal coliform concentrations in treated effluent not exceed a geometric mean of 200 colonies/100ml based on no more than one week's data and a minimum of five samples.

II. Water Quality-based Evaluation

A. Statutory Basis for Water Quality-Based Limits

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards by July 1, 1977. Discharges to state waters must also comply with limitations imposed by the state as part of its certification of NPDES permits under section 401 of the CWA.

The NPDES regulation (40 CFR 122.44(d)(1)) implementing section 301 (b)(1)(C) of the CWA requires that permits include limits for all pollutants or parameters which "are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality."

The regulations require that this evaluation be made using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation.

B. Reasonable Potential Determination

When evaluating the effluent to determine if water quality-based effluent limits are needed based on chemical specific numeric criteria, a projection of the receiving water concentration (downstream of where the effluent enters the receiving water) for each pollutant of concern is made. The chemical specific concentration of the effluent and ambient water and, if appropriate, the dilution available from the ambient water are factors used to project the receiving water concentration. If the projected concentration of the receiving water exceeds the numeric criterion for a specific chemical, then there is a reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standard, and a water quality-based effluent limit is required (see Appendix B for the applicable water quality criteria).

As mentioned above, sometimes it is appropriate to allow a small area of ambient water to provide dilution of the effluent. These areas are called mixing zones. Mixing zone allowances will increase the mass loadings of the pollutant to the water body, and decrease treatment requirements. Mixing zones can be used only when there is adequate ambient flow volume and the ambient water is below the criteria necessary to protect designated uses.

C. Procedure for Deriving Water Quality-Based Effluent Limits

The first step in developing a water quality based permit limit is to develop a wasteload allocation for the pollutant. A wasteload allocation is the concentration (or loading) of a pollutant that the Permittee may discharge without causing or contributing to an exceedance of water quality standards in the receiving water. Wasteload allocations are determined in one of the following ways:

1. TMDL-Based Wasteload Allocation

Where the receiving water quality does not meet water quality standards, the wasteload allocation is generally based on a TMDL developed by the State. A TMDL is a determination of the amount of a pollutant from point, non-point, and natural background sources, including a margin of safety, that may be discharged to a water body without causing the water body to exceed the criterion for that pollutant. Any loading above this capacity risks violating water quality standards.

Section 303(d) of the CWA requires states to develop TMDLs for water bodies that will not meet water quality standards after the imposition of technology-based effluent limitations to ensure that these waters will come into compliance with water quality standards. The first step in establishing a TMDL is to determine the assimilative capacity (the loading of pollutant that a water body can assimilate without exceeding water quality standards). The next step is to divide the assimilative capacity into allocations for non-point sources (load allocations), point sources (wasteload allocations), natural background loadings, and a margin of safety to account for any uncertainties. Permit limitations are then developed for point sources that are consistent with the wasteload allocation for the point source. A TMDL has not yet been completed for this section of the Snake River.

2. Mixing zone based WLA

When the State authorizes a mixing zone for the discharge, the WLA is calculated by using a simple mass balance equation. The equation takes into account the available dilution provided by the mixing zone, and the background concentrations of the pollutant.

3. Criterion as the Wasteload Allocation:

In some cases a mixing zone cannot be authorized, either because the receiving water already exceeds the criteria or the receiving water flow is too low to provide dilution. In such cases, the criterion becomes the wasteload allocation. Establishing the criterion as the wasteload allocation ensures that the Permittee will not contribute to an exceedance of the criteria.

Once the wasteload allocation has been developed, the EPA applies the statistical permit limit derivation approach described in Chapter 5 of the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001, March 1991, hereafter referred to as the TSD) to obtain monthly average, and weekly average or daily maximum permit limits. This approach takes into account effluent variability, sampling frequency, and water quality standards.

4. Water Quality-Based Effluent Limits

a. **Toxic Substances**

The Idaho state water quality standards require surface waters of the state to be free from toxic substances in concentration that impair designated uses. The administratively extended permit required the Permittee to conduct toxicity tests on its effluent. Results from these tests indicate that the whole effluent toxicity limits are not required for this discharge. Based on these results the toxicity testing requirements have also been deleted from the proposed permit.

b. **Floating, Suspended or Submerged Matter**

The Idaho state water quality standards require surface waters of the state to be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses. Therefore, the draft permit specifies that there shall be no discharge of floating solids or visible foam in other than trace amounts.

c. **Excess Nutrients**

The Idaho state water quality standards require surface waters of the state be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses. The Snake River has been listed as water quality limited for nutrients. As of this date a TMDL has not been established for this reach of the river. Nutrient monitoring has been incorporated into the draft permit. The results of this monitoring will be used in the development of the TMDL. A reopener clause has also been incorporated into the draft permit to allow the permit to be reopened to incorporate the determinations made in the TMDL.

d. **Sediment/TSS**

The Snake River is listed as water quality-limited for sediment, however, a TMDL has not yet been established.

Additionally, a reopener clause has been incorporated into the draft permit to allow the permit to be reopened to incorporate the determinations made in the TMDL should they be more stringent than the requirements in this draft permit.

e. **Fecal Coliform Bacteria**

The Snake River is listed as water-quality limited for pathogens. Since there is no dilution available, the facility must meet the criteria at the end of the pipe. This will ensure that primary contact recreation uses are met in the river. The effluent limits are as follows:

Average Weekly Limit = 200 colonies/100 ml.

The permit currently in effect has the following loading requirements:

May 1 - September 30: Average Monthly Limit = 50 colonies/100ml
Average Weekly Limit = 100 colonies/100ml

October 1 - April 30: Average Monthly Limit = 100 colonies/100ml[1]
Average Weekly Limit = 200 colonies/100 ml

New water quality standards adopted by Idaho in May 2000 removed the fecal coliform limits and adopted *E. coli* bacteria limits. Disinfection requirements for sewage wastewater treatment plant effluents were retained.

f. ***E. coli bacteria***

The Idaho state water quality standards require waters designated for primary contact recreation not contain *E. coli* bacteria in amounts exceeding:

(1) a single sample of 406/100 ml; or
(2) a geometric mean of 126/100 ml based on a minimum of five samples taken every three to five days over a thirty-day period.

These limits have been included in the draft permit.

g. **pH**

The Idaho state water quality standards require surface waters of the state to have a pH value within the range of 6.5 - 9.5 standard units. A review of effluent and receiving water showed that water quality standards can be met by retaining the current effluent limits for pH of 6.0 - 9.0 standard units.

h. **Total Residual Chlorine**

Idaho state water quality standards require surface waters of the state to meet an acute criterion of 19.0 Fg/L and a chronic criterion of 11.0 Fg/L for total residual chlorine. Federal regulations require permit limits for publicly owned treatment works to be expressed as an average monthly limit and an average weekly limit unless impracticable. An effluent limit that is below the analytical detection limit does not make it impracticable to incorporate that limit into the permit. Therefore, the effluent limits have been recalculated and have been included in the proposed permit.

The inability to measure to the necessary level of detection is addressed by establishing the Minimum Level[2] as the compliance evaluation level for use in reporting Discharge Monitoring Report data. Effluent discharges at or below the Minimum Level would be considered in compliance with the water quality-based effluent limit (*Draft National Guidance for the Permitting, Monitoring, and Enforcement of Water Quality-based Effluent Limitations Set Below Analytical Detection/Quantitation Levels*, March 1994).

EPA will consider the Permittee in compliance with the water quality-based effluent limits that are below the analytical detection limit provided the effluent does not exceed the minimum level. The minimum level for chlorine is 100 µg/L (*Guidelines Establishing Test Procedures for analysis and Pollutants and National Primary Drinking Water Regulations*, March 28, 1997).

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[2] Minimum Level - the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method-specified sample weights, volumes, and processing steps have been followed.

As mentioned previously, federal regulations require permit limits to be expressed as average monthly and average weekly limits, unless impracticable. Region 10 considers it impracticable to incorporate weekly limits into the permit because federal regulations do not prohibit a Permittee from increasing their sampling events above what is required in an NPDES permit. This is significant because a Permittee may collect as many samples as necessary during a week to bring the average of the data set below the average weekly effluent limit. In such cases, spikes of a pollutant could be masked by the increased sampling. While this is not a concern with pollutants that are not toxic, such as total suspended solids or phosphorus, it is a significant concern when toxic pollutants, such as chlorine or ammonia, are being discharged. Using a maximum daily limit instead of an average weekly limit will ensure that spikes do not occur, and will be protective of aquatic life. For these reasons EPA, Region 10 considers it impracticable to develop an average weekly limit for chlorine, and instead will incorporate a maximum daily limit. The average monthly limit is 119 µg/L (3.0 lbs/day) and the maximum daily limit is 173 µg/L (4.3 lbs/day) (see page C-11 for calculations). At the expanded capacity of 5.1 MGD, the average monthly limit will be 75.4 µg/L (3.2 lbs/day) and the maximum daily limit will be 109.3 µg/L (4.6 lbs/day).

i. **Dissolved Oxygen**

The Snake River is listed as water quality-limited for dissolved oxygen (D.O.). The state water quality standards require the level of D.O. to exceed 6 mg/L at all times for water bodies that are protected for aquatic life use. Effluent data are not available to determine if the facility is meeting this requirement. Effluent monitoring will be required in the draft permit in order to determine if the facility will require a permit limit in the future.

j. **Ammonia**

IDEQ has developed water quality criteria to protect aquatic life against short term and long term adverse impacts from ammonia. A reasonable potential analysis was conducted and it was found that water quality-based effluent limits are required for ammonia. The average monthly limit is 3.84 mg/l (96.1 lbs/day) and the maximum daily limit is 10.7 mg/L (267.7 lbs/day). When the design capacity of the WWTP increases to 5.1 mgd,

loading limits will be: average monthly limit, 2.32 mg/l (98.7 lbs/day) and the maximum daily limit will be 6.48 mg/L (275.6 lbs/day). For additional information on the reasonable potential analysis see page C-9, for additional information on the development of the effluent limits see page C-14.

Reasonable Potential Analysis

Total Ammonia

In the case of the Snake River the beneficial use that needs to be protected is aquatic life. The acute criterion for ammonia is 1.97 mg/L and the chronic criterion is 0.220 mg/L. The acute criterion protects against short term impacts to aquatic life, and the chronic criterion protects against long term impacts to aquatic life.

When evaluating the effluent to determine if a water quality-based effluent limit (WQBEL) is needed based on chemical specific numeric criteria, a projection of the receiving water concentration (downstream of where the effluent enters the receiving water) for the pollutant of concern is made. If the projected concentration of the receiving water exceeds the applicable numeric criterion, then there is a reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standards, and a WQBEL is required.

The following mass balance equation is used to determine the downstream receiving water concentration:

$$C_d = \frac{(C_e \times Q_e) + (C_u \times (Q_u \times \%MZ))}{Q_e + (Q_u \times \%MZ)}$$

where,
C_d = receiving water concentration downstream of the effluent discharge
C_e = maximum projected effluent concentration = 39.1 mg/L
Q_e = maximum effluent flow = 4.64 cfs
C_u = upstream concentration of pollutant = .0270 mg/L
Q_u = upstream flow = 535.8 cfs (7Q10)
%MZ = assume 25 percent mixing zone is authorized by the IDEQ

When determining the projected receiving water concentration, EPA's *Technical Support Document for Water Quality-based Toxics Controls* (TSD, 1991) recommends using the maximum projected effluent concentration. To determine the maximum projected effluent concentration (C_e) EPA has developed a statistical approach to better characterize the effects of effluent variability. The approach combines knowledge of effluent variability as estimated by a coefficient of variation (CV) with the uncertainty due to a limited number of data to project an estimated maximum concentration for the effluent. Once the CV has been calculated, the reasonable potential multiplier used to derive the maximum projected effluent concentration (C_e) can be found in Table 3-1 of EPA's TSD. A reasonable potential multiplier may vary from a low of 1 to a high of 368.

The maximum projected concentration (C_e) for the effluent is equal to the highest observed concentration value of the data set multiplied by the maximum projected concentration. Data from January 31, 1996 through February 12, 1999 was used to determine the maximum projected concentration. Data from February 28, 1998 was considered an outlier and not used in the calculations. The highest value observed was on February 7, 1999. It was 8.5 mg/L. The CV is 1.34. The reasonable potential multiplier is 4.6. The maximum projected concentration (C_e) is 39.1 mg/L (8.5 mg/L X 4.6).

The downstream receiving water concentration (C_d) is:

$$C_d = \frac{(C_e \text{ X } Q_e) + (C_u \text{ X } (Q_u \text{ X } \%MZ))}{Q_e + (Q_u \text{ X } \%MZ)}$$

$$C_d = \frac{(39.1 \text{ X } 4.64) + (0.0\text{X } (535.8 \text{ X } 0.25)}{4.64 + (535.8 \text{ X } 0.25)} = \frac{177.5}{138.49} = 1.28 \text{ mg/L}$$

The projected concentration downstream exceeds the chronic criterion for ammonia (0.220 mg/L), therefore, a water quality-based effluent limit is required.

Total Residual Chlorine

In the case of the Snake River the beneficial use that needs to be protected is aquatic life. The acute criterion for total residual chlorine is 19.0 Fg/L and the chronic criterion is 11.0 Fg/L.

The maximum projected concentration (C_e) for the effluent is equal to the highest observed concentration value of the data set multiplied by the maximum projected concentration. Data from January 31, 1989 through August 31, 1999 was used to determine the maximum projected concentration. The highest value of 0.5 mg/L was observed numerous times. The CV is 0.194. The reasonable potential multiplier is 1.08. The maximum projected concentration (C_e) is 0.54 mg/L (0.5 mg/L X 1.08).

$$C_d = \frac{(C_e \text{ X } Q_e) + (C_u \text{ X } (Q_u \text{ X } \%MZ))}{Q_e + (Q_u \text{ X } \%MZ)}$$

where,

C_d = receiving water concentration downstream of the effluent discharge
C_e = maximum projected effluent concentration = 0.54 mg/L
Q_e = maximum effluent flow = 4.54 cfs
C_u = upstream concentration of pollutant = 0.0 mg/L
Q_u = upstream flow = 535.8 cfs (7Q10)

%MZ = assume 25 percent mixing zone is authorized by the IDEQ

The downstream receiving water concentration (C_d) is:

$$C_d = \frac{(C_e \text{ X } Q_e) + (C_u \text{ X } (Q_u \text{ X } \%MZ))}{Q_e + (Q_u \text{ X } \%MZ)}$$

$$C_d = \frac{(0.54 \text{ X } 4.54) + (0.0\text{X } (535.8 \text{ X } 0.25)}{4.54 + (535.8 \text{ X } 0.25)} = \frac{2.45}{138.49} = 0.017 \text{ mg/L, or } 17 \text{ Fg/L}$$

The projected concentration downstream exceeds the chronic criterion for total residual chlorine (11.0 Fg/L), therefore, a water quality-based effluent limit is required.

Derivation of Water Quality Base d Effluent Limitations for Total Residual Chlorine and Total Ammonia

The purpose of a permit limit is to specify an upper bound of acceptable effluent quality. For water quality based requirements, the permit limits are based on maintaining the effluent quality at a level that will comply with the water quality standards, even during critical conditions in the receiving water (i.e., low flows). These requirements are determined by the wasteload allocation (WLA). The WLA dictates the required effluent quality which, in turn, defines the desired level of treatment plant performance or target long-term average (LTA).

To support the implementation of EPA's national policy for controlling the discharge of toxicants, EPA developed the "*Technical Support Document for Water Quality-Based Toxics Control*" (EPA/505/2-90-001, March 1991). The following is a summary of the procedures recommended in the TSD in deriving water quality-based effluent limitations for toxicants. This procedure translates water quality criteria for chlorine and ammonia to "end of the pipe" effluent limits.

(1) Total Residual Chlorine Calculation

Step 1- Determine the WLA

The acute and chronic aquatic life criteria are converted to acute and chronic waste load allocations (WLA_{acute} or $WLA_{chronic}$) for the receiving waters based on the following mass balance equation:

$Q_dC_d = Q_eC_e + Q_uC_u$

where, Q_d = downstream flow = $Q_u + Q_e$
C_d = aquatic life criteria that cannot be exceeded downstream
$C_{d(acute)}$ = 19 µg/L
$C_{d(chronic)}$ = 11 µg/L
Q_e = effluent design flow = 4.64 cfs
C_e = concentration of pollutant in effluent = WLA_{acute} or $WLA_{chronic}$
Q_u = upstream flow = 535.8 cfs (7Q10), 150 cfs (1Q10)
C_u = upstream background concentration of pollutant = 0 (no data available therefore, assume there is no background concentration)

Rearranging the above equation to determine the effluent concentration (C_e) or the wasteload allocation (WLA) results in the following:

$$C_e = WLA = \frac{Q_d C_d - Q_u C_u}{Q_e}$$

when a mixing zone is allowed, this equation becomes:

$$C_e = WLA = \frac{C_d(Q_u \text{ X } \%MZ) + C_d Q_e}{Q_e} - \frac{Q_u C_u (\%MZ)}{Q_e}$$

where, %MZ is the mixing zone[3] allowable by the state standards. The Idaho water quality standards at IDAPA 16.01.02060 allow twenty-five percent (25%) of the receiving water to be used for dilution for aquatic life criteria. The effluent limits have been derived using Idaho's guidelines for mixing zone. However, establishing a mixing zone is a State discretionary function, if the State does not certify a mixing zone in the 401 certification process the effluent limits will be recalculated without a mixing zone.

$$WLA_{acute} = \frac{C_d(Q_u \text{ X } \%MZ) + C_d Q_e}{Q_e} - \frac{Q_u C_u (\%MZ)}{Q_e}$$

$$= \frac{19(150 \text{ X } .25) + (19 \text{ X } 4.64)}{4.64} - \frac{150 \text{ X } 0 \ (.25)}{4.64} = 172.6 \text{ µg/L}$$

[3] Mixing zone - is an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented. Only the State of Idaho has the regulatory authority to grant a mixing zone.

$$WLA_{chronic} = \frac{11(535.8 \times .25) + (11 \times 4.64)}{4.64} - \frac{535.8 \times 0 (.25)}{4.64} = 328.5 \ \mu g/L$$

Step 2 - Determine the LTA

The acute and chronic WLAs are then converted to Long Term Average concentrations (LTA_{acute} and $LTA_{chronic}$) using the following equations:

$LTA_{acute} = WLA_{acute} \times e^{[0.5F^2 - zF]}$
where,
F^2 = $\ln(CV^2 + 1)$
z = 2.326 for 99th percentile probability basis
CV = coefficient of variation = .194
$LTA_{chronic} = WLA_{chronic} \times e^{[0.5F^2 - zF]}$
where,
F^2 = $\ln(CV^2/4 + 1)$
z = 2.326 for 99th percentile probability basis
CV = coefficient of variation = standard deviation/mean (the CV was calculated using data from January 1995 through March 1999)

Calculate the LTA_{acute} and the $LTA_{chronic}$:

LTA_{acute} = 112.4 µg/L
$LTA_{chronic}$ = 263.6 µg/L

Step 3

To protect a waterbody from both acute and chronic effects, the more limiting of the calculated LTA_{acute} and $LTA_{chronic}$ is used to derive the effluent limitations. The TSD recommends using the 95th percentile for the Average Monthly Limit (AML) and the 99th percentile for the Maximum Daily Limit (MDL).

Step 4 - Determine the Permit Limits

1. The maximum daily limit (MDL) and the average monthly limit (AML) would be calculated as follows:

$MDL = LTA_{chronic} \times e^{[zF - 0.5F^2]}$
where,
F^2 = $\ln(CV^2 + 1)$

z = 2.326 for 99th percentile probability basis
CV = 0.194
MDL = 172.6 µg/L

$AML = LTA_{chronic} \times e^{[zF - 0.5F^2]}$
where,
F^2 = $\ln(CV^2/n + 1)$
z = 1.645 for 95th percentile probability basis
CV = coefficient of variation = standard deviation/mean
n = number of sampling events required per month for chlorine = 30
AML = 119.1 µg/L

Step 5 - Loading limitations

Federal regulations (40 CFR 122.45 (f)) require effluent limits to be expressed as mass based limits. The mass loading limitations for chlorine is as follows:

AML = (AML Concentration)(Design Flow Rate)(Conversion Factor)

where:
Monthly Concentration Limit = .1191 mg/L
Design Flow Rate = 3.0 mgd
Conversion Factor = 8.34
AML = 3.0 lbs/day

MDL = (MDL Concentration)(Design Flow Rate) (Conversion Factor)
where:
Daily Maximum Concentration = .173 mg/L
MDL = 4.3 lbs/day

(2) Total Ammonia Calculation

C_d = aquatic life criteria that cannot be exceeded downstream
$C_{d(acute)}$ = 1.32 mg/L
$C_{d(chronic)}$ = 0.22 mg/L
Q_e = effluent design flow = 4.64 cfs
C_e = concentration of pollutant in effluent = WLA_{acute} or $WLA_{chronic}$
Q_u = upstream flow = 150 cfs (1Q10); 535.8 cfs (7Q10)

C_u = upstream background concentration of pollutant = 0.027 mg/L (Data from January 1996 through August 1999 was used to determine the 95th percentile background concentration).

Step 1- Determine the WLA

$$WLA_{acute} = \frac{C_d(Q_u \text{ X } \%MZ) + C_dQ_e}{Q_e} - \frac{Q_uC_u(\%MZ)}{Q_e}$$

$$= \frac{1.32(150 \text{ X } .25) + (1.32 \text{ X } 4.64)}{4.64} - \frac{150 \text{ X } 0.027 \ (.25)}{4.64} = 11.8 \text{ mg/L}$$

$$WLA_{chronic} = \frac{0.22(535.8 \text{ X } .25) + (0.22 \text{ X } 4.64)}{4.64} - \frac{535.8 \text{ X } 0.027 \ (.25)}{4.64} = 5.8 \text{ mg/L}$$

Step 2 - Determine the LTA

The acute and chronic WLAs are then converted to Long Term Average concentrations (LTA_{acute} and $LTA_{chronic}$) using the following equations:

$LTA_{acute} = WLA_{acute} \text{ X } e^{[0.5F^2 - zF]}$
where,
F^2 = $\ln(CV^2 + 1)$
z = 2.326 for 99th percentile probability basis
CV = coefficient of variation = 1.34
$LTA_{chronic} = WLA_{chronic} \text{ X } e^{[0.5F^2 - zF]}$
where,
F^2 = $\ln(CV^2/4 + 1)$
z = 2.326 for 99th percentile probability basis
CV = coefficient of variation = standard deviation/mean (the CV was calculated using data from January 1996 through August 1999)

Calculate the LTA_{acute} and the $LTA_{chronic}$:

LTA_{acute} = 1.86 mg/L

$LTA_{chronic}$ = 1.7 mg/L, used for limits calculations

Step 3

To protect a waterbody from both acute and chronic effects, the more limiting of the calculated LTA_{acute} and $LTA_{chronic}$ is used to derive the effluent limitations. The TSD recommends using the 95^{th} percentile for the Average Monthly Limit (AML) and the 99^{th} percentile for the Maximum Daily Limit (MDL).

Step 4 - Determine the Permit Limits

1. The maximum daily limit (MDL) and the average monthly limit (AML) would be calculated as follows:

$MDL = LTA_{chronic} \times e^{[zF-0.5F^2]}$
where,
F^2 = $\ln(CV^2 + 1)$
z = 2.326 for 99^{th} percentile probability basis
CV = 1.34
MDL = 10.7 mg/L

$AML = LTA_{chronic} \times e^{[zF- 0.5F^2]}$
where,
F^2 = $\ln(CV^2/n + 1)$
z = 1.645 for 95^{th} percentile probability basis
CV = coefficient of variation = standard deviation/mean
n = number of sampling events required per month for ammonia = 4
AML = 3.84 mg/L

Step 5 - Loading limitations

Federal regulations (40 CFR 122.45 (f)) require effluent limits to be expressed as mass based limits. The mass loading limitations for chlorine is as follows:

AML = (AML Concentration)(Design Flow Rate)(Conversion Factor)
where:
Monthly Concentration Limit = 3.84 mg/L
Design Flow Rate = 3.0 mgd
Conversion Factor = 8.34
AML = 96.1 lbs/day

MDL = (MDL Concentration)(Design Flow Rate) (Conversion Factor)
where:
Daily Maximum Concentration = 10.7 mg/L
MDL = 267.7 lbs/day

APPENDIX D
ENDANGERED SPECIES ACT

Section 7 of the Endangered Species Act (ESA) requires federal agencies to request a consultation with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service regarding potential effects an action may have on listed endangered species.

In a letter dated January 19, 2000, the National Marine Fisheries Service (NMFS) stated that no anadromous fish species that are either proposed, listed, or candidates for listing under the Endangered Species Act (ESA) occur in the Snake River in the vicinity of Blackfoot, Idaho. The discharge location is not within designated or proposed critical habitat for listed salmon or steelhead.

In a letter dated December 17, 1999, the US Fish and Wildlife Service (USFWS) supplied a list of threatened, proposed, and/or candidate species which may be present in the area of the Blackfoot wastewater discharge.

LISTED SPECIES	**COMMENTS**	**PROPOSED SPECIES**	**CANDIDATE SPECIES**	**SPECIES OF INTEREST**
Bald eagle (LT) *(Haliaeetus leucocephalus)*	Wintering area	None	None	Trumpeter swan *(Cygnus buccinator)*
				Pygmy rabbit *(Brachylagus idahoensis)*
				Yellowstone cutthroat trout *(Oncorhynchus clarki bouvieri)*
Ute ladies' - tresses *(Spiranthes diluvialis)*				

Ute ladies' tresses

These plants have the potential to occur in wetland and riparian areas, including springs, wet meadows, and river meanders. The plant is know to occur at sites ranging from 1,500 to 7,000 feet elevation (Blackfoot is at approximately 4,500 feet elevation). This species generally flowers from mid-July through September, and can be identified definitively only at that time. The orchid can remain dormant for several years. The species may be adversely affected by modification of riparian and wetland habitats associated with livestock grazing, vegetation removal, excavation, construction for residential or commercial purposes, stream channelization, hydroelectric development and operation, and other actions that alter hydrology.

EPA has determined that issuance of the draft permit will not impact the Ute ladies' tresses. Principle threats to Ute ladies' tresses are modification of riparian and wetland habitats. This draft permit will have no impact on any of these issues. Therefore, EPA has determined that the Blackfoot WWTP discharge will not adversely affect the Ute ladies' tresses.

Trumpeter Swan, Pygmy Rabbit, and Yellowstone cutthroat trout

Hunting and habitat destruction are the primary causes of trumpeter swan and pygmy rabbit decline. In addition, introduction of non-native trout species also contribute to Yellowstone cutthroat trout decline. Issuance of an NPDES permit for the City of Blackfoot wastewater treatment plant will not result in habitat destruction, nor will it result in changes in population that could result in increased habitat destruction. Therefore, EPA has determined that the Blackfoot WWTP discharge will not adversely affect the trumpeter swan, pygmy rabbit or Yellowstone cutthroat trout.